

# Promoting Tribal Science and Wellness: Linking Subsistence Culture to Differential Exposures

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## Background

Subsistence lifestyles often rely on the use of ecosystem resources to obtain the necessities for individual or community wellness. There is increasing awareness that the lifestyles and cultural practices of subsistence-based communities may contribute to health and exposure disparities between many Tribes and the general US population--particularly when considering the fish consumption and dietary intake of Tribal communities, as there are a variety of fish baiting, catching, cleaning, storing, and preparing techniques. To elucidate the ways in which subsistence populations are differentially exposed to toxics compared with the greater population, the US EPA and Centers for Disease Control and Prevention launched a novel competitive extramural research initiative to develop more refined exposure methodologies while concomitantly exploring risk mitigation options that are appropriate to subsistence populations.

## Research Portfolio

This research portfolio was designed to encompass traditional and non-traditional scientific approaches to collect baseline data that link culture and exposure. For example, collection and chemical analysis of multiple whale, walrus, seal, and reindeer tissues, including muscle, blubber and organ samples, are being conducted in Northern and Western Alaska in partnership with Saint Lawrence Island Yupiks and Inupiat hunters. A scientifically based, eco-cultural zone map across the United States is in the final stages of development for the purposes of more refined exposure and quantitative risk assessment. Developing ecoregion-specific subsistence exposure scenarios integrates a combination of baseline ecological descriptions with anthropologically defined information on subsistence lifestyle and diet. A Pacific Northwest tribe is analyzing bioaccumulative toxics in shellfish and sediments in combination with dietary surveys to accurately assess exposure and risk. A mercury (Hg) risk intervention study in the Great Lakes region is using geographic information system (GIS) mapping to inform Tribal decisions for subsistence fishing.



## Preliminary Results

Butter Clams				Steamed clams			
	Child Non-Cancer	Adult Non-Cancer	Cancer		Child Non-Cancer	Adult Non-Cancer	Cancer
PCB Congeners	3.E+00	7.E-01	2.E-05	PCB Congeners	3.E+00	6.E-01	1.E-05
Arsenic	7.E-01	2.E-01	2.E-05	Arsenic	7.E-01	2.E-01	8.E-06
Dioxins/Furans	7.E-02	2.E-02	2.E-05	Dioxins/Furans	5.E-02	1.E-02	2.E-05
Other heavy metals	3.E-02	6.E-03		Other heavy metals	4.E-02	9.E-03	
TBT	4.E-04	8.E-05		TBT	2.E-04	3.E-05	
PAHs	3.E-05	7.E-06	2.E-07	PAHs	3.E-05	6.E-06	2.E-07
<b>Totals</b>	<b>4.E+00</b>	<b>9.E-01</b>	<b>5.E-05</b>	<b>Totals</b>	<b>4.E+00</b>	<b>8.E-01</b>	<b>4.E-05</b>

## Discussion:

Subsistence populations live disproportionately near Superfund or other toxic sites. The lifestyles and cultural practices of Tribal populations are qualitatively distinct and can, consequently, modify their risk. However, baseline information on exposure sources, pathways, and variation is needed before causal relationships between individual/cumulative toxic exposures and wellness outcomes can be tested. These studies are building Tribal capacity to strengthen their scientific relationships with State and Federal agencies—a critical step in developing more accurate risk assessments and risk management options that consider the economic and cultural needs and traditions of Tribal communities.



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